

**US LHC Accelerator Research Program
Task Sheet for FY05**

M. Furman, LBNL

Task Name: Accelerator Physics / Electron-Cloud Effects

DRAFT Date: June 7, 2004

During the current SPS run, which started in May 2004, we intend to give high priority to EC simulations, code comparisons and calibration against experimental results before a long shutdown begins in November 2004. In addition, we intend to better understand the ECE in the cold sections of RHIC.

Electron-cloud effect deliverables for FY05

Install CERN electron detector in a RHIC cold magnet (FY04-05) (U. Iriso, A. Drees)

Measure tune shift along batch at RHIC (FY05) (U. Iriso, A. Drees)

Simulate ECE at RHIC, calibrate code(s), understand cold vs. warm differences in EC density and conditioning. U. Iriso to learn POSINST (FY05) (U. Iriso, M. Furman)

Reproduce, by means of simulations, the measured spectrum and spatial distribution of the EC at SPS. Reproduce SPS strip detector and calorimeter results. Understand POSINST-ECLOUD differences (FY04-05) (M. Furman, M. Pivi)

Devise experiment to be compared against upcoming SPS measurements to constrain SEY model, eg., build-up and decay time of EC. Suggestion: measure various EC signals vs. N, sB, batch gap length, etc. (FY04-05) (M. Furman, U. Iriso, M. Pivi)

First cut at defining optimal LHC conditioning scenario (FY04-05) (M. Furman, U. Iriso, M. Pivi)

Understand global parameter space (eg., EC density vs. a few beam, vacuum and surface parameters) (FY05+) (M. Furman, U. Iriso, M. Pivi)

Understand physics of BNL map simulation technique (FY05) (U. Iriso, M. Furman)

Simulate EC build-up and decay in quads (to be measured at SPS by CERN personnel, by means of a "sweeping" detector) (FY05+) (M. Furman, M. Pivi)

Simulate and predict EC at diagnostic bench that will be installed in IR4 in the LHC (Jose Miguel Jimenez) (FY06+) (M. Furman, M. Pivi)

Think about microwave transmission measurements of EC density (J. Byrd, M. Furman)
(?)

Think about BTF measurements (?)

Measure ion desorption rate and composition by ion bombardment (?)

Re-measure SEY at low energy (<20 eV); attempt to reproduce CERN data obtained by Cimino and Collins. Re-measure photoelectric yield and photon reflectivity for actual sawtooth beam screen samples. Do cold and warm measurements. Repeat, if possible, in the presence of a B-field. Attempt to resolve alleged existing discrepancies. (?)

CERN contacts: F. Zimmermann, J. M. Jiménez, G. Arduini, D. Schulte

Budget:

LARP Electron-Cloud Effects Budget			
Institution	FY05 (FTEs)	FY06 (FTEs)	Personnel
LBNL	0.3	1.2	M. Furman + 1 postdoc
BNL	0.3	1.0	U. Iriso, A. Dress + 1 postdoc (?)